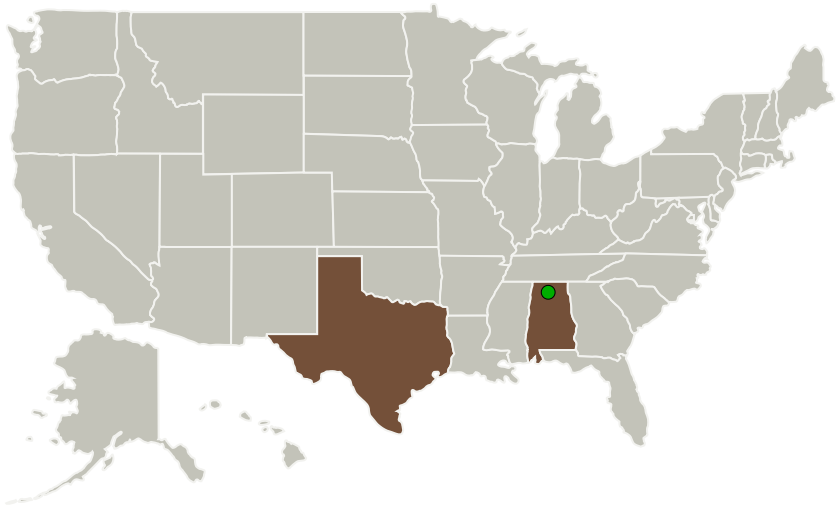
# Diamond_Copper Materials Based Solution for Improved Engine Performance, Phase I

Completed Technology Project (2016 - 2016)

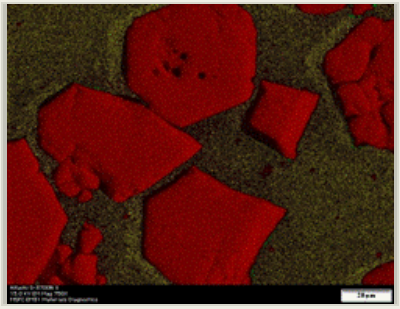
## Project Introduction

A Narloy-Z-diamond particulate composite providing increased thermal conductivity and light weight will be developed for use in liners for liquid rocket engine thrust chamber designs at similar cost to NarloyZ. Shortcomings of previous copper-diamond products have been poor resistance to thermal cycling and high cost. In the current work, attention will be given to developing a strong, chemically bonded metallurgical interface between the copper alloy and diamond phases to resist thermal cycle damage under operational conditions for the thrust chamber

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Global Technology Enterprises, Inc. | Lead Organization | Industry<br>Small Disadvantaged Business (SDB) | Bozeman, Montana |
| Marshall Space Flight Center(MSFC) | Supporting Organization | NASA Center | Huntsville, Alabama |



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## Table of Contents

**Small Business Innovation Research/Small Business Tech Transfer**

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| Primary U.S. Work Locations | |
|---|---|
| Alabama | Texas |

## Project Transitions

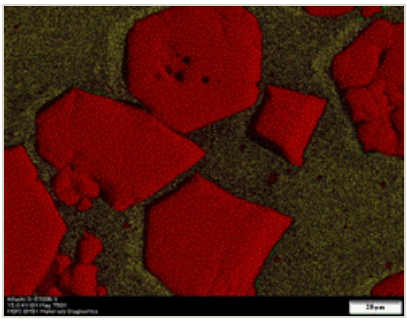
**June 2016:** Project Start

**December 2016:** Closed out

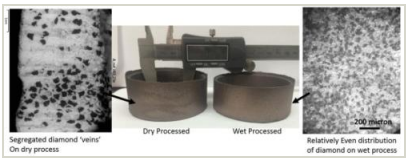
**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/139870)*

## Images



**Briefing Chart Image**
Diamond_Copper Materials Based Solution for Improved Engine Performance, Phase I
*(https://techport.nasa.gov/image/133134)*




**Final Summary Chart Image**
Diamond_Copper Materials Based Solution for Improved Engine Performance, Phase I Project Image
*(https://techport.nasa.gov/image/136983)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Global Technology Enterprises, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

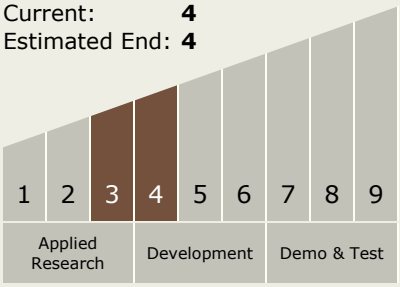
Carlos Torrez

**Principal Investigator:**

Todd G Johnson

## Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System